

1. A sample of a gas is contained in a closed rigid cylinder. According to kinetic molecular theory, what occurs when the gas inside the cylinder is heated?

- A) The number of gas molecules increases.
- B) The number of collisions between gas molecules per unit time decreases.
- C) The average velocity of the gas molecules increases.
- D) The volume of the gas decreases.

2. Under which conditions of temperature and pressure would helium behave most like an ideal gas?

- A) 50 K and 20 kPa B) 50 K and 600 kPa
- C) 750 K and 20 kPa D) 750 K and 600 kPa

3. Two basic properties of the gas phase are

- A) a definite shape and a definite volume
- B) a definite shape but no definite volume
- C) no definite shape but a definite volume
- D) no definite shape and no definite volume

4. An assumption of the kinetic theory of gases is that the particles of a gas have

- A) little attraction for each other and a significant volume
- B) little attraction for each other and an insignificant volume
- C) strong attraction for each other and a significant volume
- D) strong attraction for each other and an insignificant volume

5. Which gas is *least* likely to obey the ideal gas laws at very high pressures and very low temperatures?

- A) He B) Ne C) Kr D) Xe

6. A real gas behaves more like an ideal gas when the gas molecules are

- A) close and have strong attractive forces between them
- B) close and have weak attractive forces between them
- C) far apart and have strong attractive forces between them
- D) far apart and have weak attractive forces between them

7. Which gas would behave most nearly like an ideal gas at STP?

- A) CO₂ B) H₂ C) Cl₂ D) NH₃

8. The table below shows mass and volume data for four samples of substances at 298 K and 1 atmosphere.

Masses and Volumes of Four Samples

Sample	Mass (g)	Volume (mL)
A	30.	60.
B	40.	50.
C	45	90.
D	90.	120.

Which two samples could consist of the same substance?

- A) A and B B) A and C
- C) B and C D) C and D

9. A sample of oxygen gas is sealed in container X. A sample of hydrogen gas is sealed in container Z. Both samples have the same volume, temperature, and pressure. Which statement is true?

- A) Container X contains more gas molecules than container Z.
- B) Container X contains fewer gas molecules than container Z.
- C) Containers X and Z both contain the same number of gas molecules.
- D) Containers X and Z both contain the same mass of gas.

10. A sample of helium gas has a volume of 900. milliliters and a pressure of 2.50 atm at 298 K. What is the new pressure when the temperature is changed to 336 K and the volume is decreased to 450. milliliters?

- A) 0.177 atm B) 4.43 atm
- C) 5.64 atm D) 14.1 atm

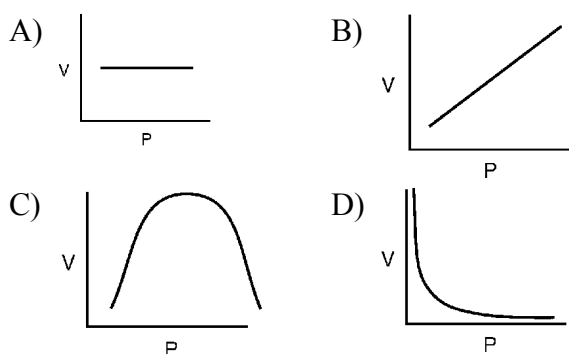
11. A gas occupies a volume of 444 mL at 273 K and 79.0 kPa. What is the final kelvin temperature when the volume of the gas is changed to 1880 mL and the pressure is changed to 38.7 kPa?

- A) 31.5 K B) 292 K
- C) 566 K D) 2360 K

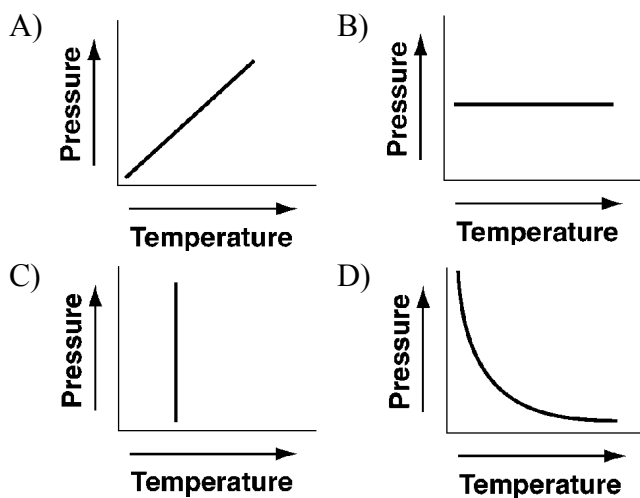
12. A sample of gas is held at constant pressure. Increasing the kelvin temperature of this gas sample causes the average kinetic energy of its molecules to

- A) decrease and the volume of the gas sample to decrease
- B) decrease and the volume of the gas sample to increase
- C) increase and the volume of the gas sample to decrease
- D) increase and the volume of the gas sample to increase

13. Which graph best represents the pressure-volume relationship for an ideal gas at constant temperature?



14. Which graph shows the pressure-temperature relationship expected for an ideal gas?



15. A 3.00-liter sample of gas is at 288 K and 1.00 atm. If the pressure of the gas is increased to 2.00 atm and its volume is decreased to 1.50 liters, the Kelvin temperature of the sample will be

- A) 144 K B) 288 K C) 432 K D) 576 K

16. Which temperature change would cause the volume of a sample of an ideal gas to double when the pressure of the sample remains the same?

- A) from 200°C to 400°C
- B) from 400°C to 200°C
- C) from 200 K to 400 K
- D) from 400 K to 200 K

17. As the temperature of a gas increases at constant pressure, the volume of the gas

- A) decreases B) increases
- C) remains the same

18. A sample of a gas occupies 6.00 liters at a temperature of 200. K. If the pressure remains constant and the temperature is raised to 600. K, the volume of the gas sample would be

- A) 18.0 L B) 2.00 L
- C) 3.00 L D) 12.0 L

19. The volume of a sample of a gas is 1.0 liter at STP. If the pressure remains constant and the temperature is raised to 546 K, the new volume of the gas will be

- A) 0.25 L B) 2.0 L
- C) 0.50 L D) 4.0 L

20. Under which conditions will the volume of a given sample of a gas decrease?

- A) decreased pressure and decreased temperature
- B) decreased pressure and increased temperature
- C) increased pressure and decreased temperature
- D) increased pressure and increased temperature

21. At STP, which gas diffuses at the faster rate?

- A) H₂ B) N₂ C) CO₂ D) NH₃